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A NEW ASTRONOMY FOR BEGINNERS. BY DAVID P. TODD, M. A., PH. D., PROFESSOR OF ASTRONOMY AND DIRECTOR OF THE OBSERVATORY, AMHERST COLLEGE. AMERICAN BOOK CO., NEW YORK. 12MO. 480 PP. \$1.30.

As indicated in the title, this book is intended for those having no previous acquaintance with astronomy. It is written in an easy, descriptive style, and without presupposing mathematical knowledge beyond the most elementary notions of geometry. By far the greater part of the work is devoted to a description of the fundamental principles of the science; next in order comes the exposition of well ascertained facts, while matters that are as yet mere theories rightly receive but little attention. The portions of the book devoted to the methods and results of astrophysical research are very limited, amounting to less than five per cent of the whole, or much less than would be expected in view of the prominence which has attached to this department of the subject.

The book contains nearly 350 illustrations, most of them very good. They may be roughly grouped as follows: Six colored plates, some sixty astronomical drawings and celestial photographs, some twenty illustrations of instruments and observatories, and many diagrams. These diagrams constitute a characteristic feature of the book. In most cases, words, phrases or sentences are printed along the lines forming them, so as to make their meaning clear without further explanation, though such explanation is also given in the text. Another characteristic feature is the detailed directions for the construction and use of simple apparatus to enable the student to derive from his own observations, in a rough way, to be sure, but correct in principle, approximate values of some of the more easily obtainable astronomical constants.

While the book, as a whole, is a good one, and contains a large amount of well-selected and accurate information concerning astronomical matters, there are, as may be expected in first editions, some blemishes that appear in the course of a critical examination. One of these is an occasional incompleteness of description, marring somewhat the effectiveness of the exposition. This, in general, is not serious, and in part seems to result from the plan of the work, in that elementary explanations are

often first given, to be followed later by more complete ones. Such, however, is not always the case. For example, the account of TALCOTT'S method for finding the latitude (p. 85) carefully omits the fundamental principle of the method. We also notice the occasional inclusion of matter wholly irrelevant to the subject of the paragraph in which it is given. This, of course, is of little consequence, and merely indicates imperfection in the order of arrangement. Some of the statements made in relation to the surfaces of the planets, particularly some of those giving interpretations in explanation of the phenomena observed on *Mars*, are not likely to pass unchallenged. The last sentence on page 121, viz., "About the 20th March, at mean noon, when the fictitious sun is crossing the equator, etc.," reads strangely, in view of the fact that this "fictitious sun" (p. 111) travels in the equator. Chapter II, which is probably the weakest in the book, contains some loose description, some poor diagrams and some erroneous definitions. The diagrams on pp. 35 and 37 bid defiance to the laws of projective geometry, and it is difficult to imagine how they can be otherwise than confusing to the student. On page 37, the ecliptic is defined in such a way as to be a fixed circle in reference to the horizon, and on the next page the equinoxes in such a way as to be fixed points in the meridian. The logical consequence of these definitions would be that the solstices are fixed points in the horizon, coincident with the east and west points. The definitions referred to are as follows: "Imagine the equator system pivoted at the two opposite points where equator and meridian cross. Then carry the north pole towards the west  $23\frac{1}{2}^{\circ}$ . The equator will then have assumed a position inclined by an angle of  $23\frac{1}{2}^{\circ}$  to its former position. It will, in short, have become the ecliptic. . . . Upper of the two pivotal points upon which the equator turned about meridian is called the *Vernal Equinox*, or First of Aries; its opposite point,  $180^{\circ}$  away, the *Autumnal Equinox*." These definitions, as they stand, are wholly inadmissible. They lack completeness and accuracy of statement, and do much to accentuate the looseness of expression prevalent in the chapter containing them.

W. J. HUSSEY.

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